

THURSDAY, MAY 29, 1873

THE ZOOLOGICAL STATION AT NAPLES

ROME was not built in a day, says the proverb,—and so far, at least, the Zoological Station resembles the Eternal City,—for it is not yet quite finished.

The difficulties have been sufficient to explain this delay. The complexity of a building of this kind, which had to combine so many technical arrangements with scientific requirements without neglecting beauty of appearance and the comfort of a dwelling-house for the principal, assistant naturalists, and other officials, will easily be conceived by those who have ever attempted to carry out the plan of an establishment *sui generis*. Add to this, that the dimensions of the building were limited before a stone was laid, that the sums allotted for the construction were by no means unlimited, that all had to be done in so difficult a place as Naples, by a foreigner who never had experience in practical pursuits of this intricate nature, but is a naturalist, and not a business man.

At the same time, one must not believe that this delay has been altogether a misfortune. Though the Zoological Station had to pass through more than one "crisis," it has been particularly lucky: dangerous as the aspect of all these critical situations seemed, nevertheless it has always escaped, and now finds itself in better circumstances than it would have been without them. This seems principally due to the fact that in struggling against difficulties and enemies, one is forced to strengthen and augment one's auxiliary troops, and thus the army of supporters gets greater and greater, and triumph is more easily secured than before.

As the outlay had been considerably increased in consequence of greater dimensions, and some internal arrangements, it became necessary to find additional funds. I am happy to say, that on my application, the German Empire, after having consulted the Berlin Academy of Sciences, consented to contribute 1,500*l*. The Italian Government likewise promised, on my personal application to the Minister of Finances, Dr. Sella, to remit the not unimportant sums that had to be paid as duties on the importation of the machinery and the great glasses.

On the other hand, I formed a new scheme for keeping up the establishment. Some of the readers of NATURE may remember, perhaps, that the whole place was founded upon the income of the Aquarium, which is combined with the Zoological Station. The bulk of the capital being augmented, and the whole establishment in all its parts increased, the sums necessary for supporting it likewise must increase. Instead of ten places to be given to foreign naturalists, who come to work in the Zoological Station, there are now twenty. The number of officials, scientific and unscientific, will increase at the same rate, and everything else, too. Desirable as such an event must be for science' sake, much as it would increase the importance of the new Institution, there can be no doubt that it would also greatly increase its annual wants.

I pursued, therefore, as much as I could, the plan for letting the tables in the laboratories,—a plan which has

been spoken of in NATURE (vol. vi. p. 362). I am happy to say that at present Italy as well as Prussia has consented to hire each two tables. Bavaria, too, is likely to take one table, and further applications have been made to Saxony, to Baden, and some other places, which at present cannot be indicated, as negotiations are still impending.

The Library of the Station has made very important progress. The Zoological Society of London has generously granted the complete set of their Proceedings; the British Association the complete set of their Transactions. Dr. Engelmann, the Leipzig publisher, has again made a splendid gift of all that he has published since 1870; Viet and Co., of Leipzig, have given the eight last volumes of the *Archiv für Anatomie und Physiologie*: Friedländer, of Berlin, has sent some of his most valuable books; and single naturalists constantly send in their publications. The Catalogue of the whole Library will soon appear, and be delivered to the scientific public as Appendix to the *Zeitschrift für wissenschaftliche Zoologie*.

The Station has already made its presence felt in the world of Zoology, by sending to Universities and Laboratories collections of Mediterranean animals. What makes this especially valuable is, that by the careful way in which the required specimens have been prepared and preserved, they are always capable of being dissected and even studied in a histological way, which seldom is the case with museum specimens. Thus the Universities of Marburg, Göttingen, Munich, Strasburg, Jena, and others, have received such collections as were asked for by the Professors of Zoology; besides this, the zoologists that passed during the last winter to Naples or Messina, have been always assisted by the scientific staff of the Station.

We have also succeeded in sending animals alive to distant places. Thus it has become very generally known that a small parcel containing some specimens of *Amphioxus* has been received as a charged letter in the Crystal Palace Aquarium; and I hear from Mr. Lloyd that the small animals are still alive. We succeeded also in sending some large crabs over by steamer.

It is my intention to develop as much as may be this department of the activity of the Station, and I take this opportunity of stating that the Station will send Mediterranean animals of every kind and in any state of preparation to those who make application for them. The charges will be as moderate as possible, always in accordance with the self-supporting principle, so as to enable every part of the establishment to provide for its own wants.

ANTON DOHRN

Naples, May 8

GAUDIN'S "WORLD OF ATOMS"

L'Architecture du Monde des Atomes, dévoilant la structure des composés chimiques et leur cristallogénie.
Par Marc-Antoine Gaudin. (Paris: Gauthier-Villars, 1873.)

IT is now more than forty years since Ampère, in his lectures at the Collège de France, was discussing the evidence in favour of the existence of atoms, and the difficulties of any scientific investigation of their properties and relations. M. Gaudin, one of his hearers, was struck,

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as he tells us, with the importance of this investigation, and then and there devoted the efforts of his whole life to carry it out. Accordingly, in 1832 he presented a very extensive work to the Academy of Sciences, a report on which, by MM. Gay-Lussac and Becquerel, is annexed to the volume before us.

The ideas developed in this work were derived from two sources—crystallography and chemistry. Haüy had endeavoured to explain the regularity of the forms of crystals by regarding them as built up of molecules, the form of each molecule being similar to that of the simplest solid which can be obtained from the crystal by cleavage. The absolute size of these integrant molecules, as they were called, was left, of course, indeterminate.

Wollaston preferred to regard the arrangement of the ultimate molecules in a crystal as resulting, not from their accurately fitting one another as bricks do in a wall, but from their tendency to crowd together into the smallest possible volume as peas do in a bag. The form of the molecules, according to Wollaston, was not polygonal, but spherical or ellipsoidal.

At this point Ampère took up the theory. His atoms were no longer either closely fitted together, or even touching one another at isolated points, but were maintained by attractive and repulsive forces at distances exceedingly great compared with their own dimensions. The forms of the atoms themselves were therefore no longer considered as of any importance; the molecules, formed of groups of these atoms, were represented in diagrams as systems of points; and the explanation of the geometrical properties of the substance in the crystalline form was sought in the geometrical arrangement of these atoms.

The proportions in which the atoms of different kinds were to be represented in the molecules were determined in accordance with the atomic theory of chemistry, established by Dalton, and the absolute number of such atoms in the molecule was arranged so as to satisfy the law of gases, recently discovered by Gay Lussac, which asserts that the mass of every gaseous molecule is proportional to the specific gravity of the gas at the standard pressure and temperature.

The theory of M. Gaudin may be regarded as founded upon that of Ampère, with certain modifications. Instead of assuming with Ampère, that when two molecules combine, the form of the compound molecule is the resultant of the forms of its components, he supposes that the atoms of the combining molecules are all thrown into a common stock, to be arranged, according to some principle of equilibrium or of symmetry, in a form having no necessary relation to the forms of the combining molecules.

In the work before us M. Gaudin gives us, as the result of his long-continued meditation on compound molecules, actual diagrams of their supposed forms, showing not only their outward shape, but the arrangement of the molecules in each of the layers in which they are disposed. The ingenuity with which he has arranged in a symmetrical manner groups sometimes amounting to 279 atoms must be seen in order to be appreciated. But the merit of these arrangements as an explanation of facts must be tested, first by a careful comparison of those forms whose chemical relations are similar, and then by a comparison of each diagram with the crystallo-

graphic properties of the substance which it is supposed to represent. The author has, to the best of his ability, applied both these tests, and we shall not here pronounce sentence upon the result of such an examination.

We may remark, however, that M. Gaudin began his labours forty years ago, using the methods of investigation which we have briefly described. Since that time he has been patiently arranging his atoms by rows and groups, and representing them in models by means of pearls of various hues. He has shown no symptom of being attracted towards any of those newer paths which Joule, Clausius, and others have opened up into the higher regions of kinetic molecular science. Indeed we not only find no mention of the names of any of these men, but we look in vain for any indication of a desire to pass beyond mere geometrical arrangements of atoms, and to inquire into the forces with which they act on each other or the motions with which they are agitated. There is a chapter, indeed, entitled "*Hémihédrie et pouvoir rotatoire*," but though there is something about hemihedry, there is nothing there at all about the power of rotating the plane of polarisation of light. The only piece of dynamics in the book is the theory of capillary phenomena at p. 197, about which the less we say the better.

M. Gaudin is favourably known to science as an adept in the management of the blow-pipe. He has melted the most refractory bodies, and compounded the oriental ruby from its elements. He has not only established the chemical formula of silica and modelled its molecule, but he has fused quartz into beads, and drawn it into threads like spun glass.

His experimental researches have displayed great ingenuity and manipulative skill, but have often been brought to an untimely end for want of funds to carry them on. In his theoretical speculations he has been guided by geometry alone, without the powerful if not absolutely necessary aid of dynamics; and in the great work of his life he has met with very little encouragement, and has been sustained only by his conviction of the scientific value of the treasure of which he is in search.

OUR BOOK SHELF

A Manual of Photography. By George Dawson, M.A. Eighth edition. (J. and A. Churchill.)

THE new edition of this excellent manual of photography, which is founded on and incorporates as much of Hardwick's "*Photographic Chemistry*" as is valuable in the present further advanced stage of the art, retains its position as the best work on the subject for amateurs, as well as professionals. The many new methods and materials which are so frequently being introduced, make it essential that any book professing to keep up to the times must be frequently revised, and Dr. Dawson has in this work presented the subject in its most advanced position. The earlier chapters, after giving a short sketch of the history of photography, enter into a description of the most important experiments, the expansion of which make up the subject itself. This is followed by a review of the various lenses required for the many different purposes to which photography is applied, and their peculiarities are rendered more evident by the introduction of very clear diagrams of them in section. After a full description of the various points connected with the wet-plate